VTCA SPRING CONFERENCE
Structure and Bridge Presentation 2019

Kendal R. Walus, PE
State Structure and Bridge Engineer

April 11, 2019
Upcoming Procurements

- **Inspection Contract**
  - NOVA Inspection for Ancillary Structures (May - RFP) - Multiple Award Inspection Contract

- **Design Contracts – Project Specific**
  - Culpeper - Single Bridge - Project (Possible June - RFP)
  - Richmond - Varina-Enon Bridge Maintenance Plan - Project Specific (Possible August - RFP)
  - NOVA Project Specific – Two Potential Projects – Advertisement - TBD
Performance

Chart 2 - Percentage of Non-SD Structures Statewide by Count and Deck Area (Nine Year Trend)

Based on FY2018 Data
VA Responsible Structures
Performance – Non-SD Structures Trend

Based on January, 2019 Data

VA Responsible Structures

Graph of Recent Progress

December 31, 2018 - 95.5%
Statewide Target for All Bridges & Culverts, and NBI Structures

Percentage of Non-Deficient Structures

100%
98%
96%
94%
92%
90%


94.9% 95.1% 95.3% 95.6% 95.7% 95.9% 96.0% 96.1% 96.3%
94.2% 94.3% 94.5% 94.7% 94.9% 95.1% 95.3% 95.5% 95.6%
ARTBA National Ranking of Virginia NBI Bridges

Each bar shows the national ranking among 52 states.
2018 National Steel Bridge Alliance Award

- 2018 NSBA Prize Bridge Award
  - Short Span Category
- 1st Bridge in USA to Use 50CR for:
  - Tapered Girder Webs
  - Cross Frames
  - Stainless Steel High Strength Bolts

Route 340 over South River – Waynesboro, Virginia
Staunton District
2018 PCA Bridge Design Award of Excellence

- 2018 PCA Concrete Bridge Award
  - 1 of 8 Winners in USA
  - Recognition of Creativity and Imagination in the Structural, Functional, Aesthetic, Sustainable and Economic Design
- 1<sup>st</sup> Bridge in USA to Use CFRP for:
  - All Reinforcement in Bulb-T Beams

Route 49 over Aaron’s Creek – Halifax County, Virginia
Lynchburg District
Roads & Bridges 2018 Top 10 Bridges - 6th Place

- 2018 *Roads & Bridges* Top 10 Bridges
  - Longest Steel Jointless Bridge in VA
  - Use of Virginia Abutment
  - Use of Low Shrinkage Concrete (before 2016 Specs)
  - Alternate Foundation Design
  - Innovative Construction Details

Route 340 over South Fork Shenandoah River - Front Royal, Virginia
Staunton District
2018 ACI Excellence in Concrete Construction

- Won in Both the Category “Infrastructure” as well as the Commonwealth Award
- First Bridge in Commonwealth to use the New Adjacent Member Connection Detail
- Innovative Connection that Effectively Transfers the Loads Transversely
- Filling Material, Very High Performance Concrete (VHPC)
- Significantly Reduces the Lap Splice Length for the Steel Reinforcement

Route 744 over Bluestone River - Tazewell County, Virginia
Bristol District
2019 ACEC Virginia’s Engineering Excellence Awards

- 2019 Honor Award Category
  - Context Sensitive Design
  - Diverging Diamond Interchange
  - Architectural Treatment
  - Successful Incorporation of Concrete Bridge Panel

Southgate Drive over Route 460 – Blacksburg, Virginia
Salem District
Bridge Crews

- 2018 Bridge Crew Accomplishments
  - Perform Work for 35% Cost of the Contractor Community
  - Performed Preventative Maintenance on over 3,473 Bridges
  - Rehabilitated 84 Structurally Deficient Bridges
  - Replaced 83 Structurally Deficient Bridges
Innovations

- Implementation of New Technologies:
  - Continuous Spans for New Bridges – 1970’s
  - Latex Modified Concrete Deck Overlays – 1970’s
  - Three Coat Zinc Based Paints – 1982
  - High Performance Concrete in All Bridge Elements - 2003
  - Corrosion Resistant Reinforcing Steel – 2008
  - Jointless Bridge Technology – 2011
  - Self Consolidating Concrete for Drilled Shafts - 2015
  - Low Shrinkage Concrete in Bridge Decks – 2015
  - Latex Modified Overlays Using Hydro Demolition – 2015
  - Carbon Fiber and Stainless Steel Prestressing Strands in Piles – 2017
  - Inverted Tee Beam - 2017
  - Corrosion Resistant Structural Steel (Grade 50CR) – 2018
  - Elastomeric Concrete Plug Joints - 2018
  - Engineered Cementitious Concrete for Steel Culvert Repairs - 2018
Innovations

- Design
  - Jointless Design
  - Use Virginia Abutment and Pier Details
- Eliminate Joints Where Possible
  - Closures
  - Deck Extensions
- Corrosion Resistant Reinforcing Steel
- Low Shrinkage Concrete in Bridge Decks
Innovations

• Closure Pours and Overlays

I-64 Over Dunlap Creek – Staunton District
Innovations

• Overlays
Innovations

- Carbon Fiber/Stainless Steel Prestressing Strands

Nimmo Parkway – 18 Piles Virginia Beach, Virginia
Hampton Roads District
Innovations

• Carbon Fiber Prestressing Strands for Bulb Tee Beams

Route 49 over Aaron’s Creek - Lynchburg District
Innovations

• Elastomeric Concrete Plug Joints
Innovations

- Inverted Tee Beam Standard
  - Up to 45 Feet
  - Improved Constructability
Innovations

- Engineered Cementitious Concrete Culvert Repair
Upcoming Changes to Design Guidelines

• Upcoming Items Heading Your Way:
  • Plan Sheet Development Guidance Update
  • More Mash Crash Tested Bridge Barriers
    • Single Slope Concrete Parapet (SSCP) Standard
  • Guidance on Box Culvert Wingwalls
  • Design Guidance on Climate Change
  • Introduction of New Materials
    • ECC and VHPC
    • Carbon Fiber Prestressing Bulb Tee Girder Standards
  • Special Provision for Superstructure Erection Stability
    • Concrete and Steel Main Members
Trends

• Continued Focus on Safety - IIM S&B 96 – Lead Exposure Safety Directive:
  • VDOT’s Lead Exposure Control Program Manual – September 2018
Trends

• Unmanned Aerial Vehicle Inspections
  • To be Used Where Most Practical
    • High Mast Light Poles
    • Confined Areas
    • Tall Piers
  • FAA Regulations
  • Licensing Requirements
  • Data Management
  • Need for Artificial Intelligence – Scanning Data and Making Recommendations on Where to Look for Problems